TWIN STATE ENVIRONMENTAL CORP.
P.O. Box 719, Commercial Park, 1A Huntington Road, Richmond, VT 05477
Tel.: (802) 434-3350 • Fax: (802) 434-4478 • Email: tsefs@together.net

November 16, 1998

Mr. and Mrs. Scott and Jody Davidson
P.O. Box 776
Woodstock, Vermont 05091

RE: Site Investigation Activities
Davidson Residence - Quechee, Vermont
TSEC Project #97-092 SMS Site #98-2384

Dear Mr. and Mrs. Davidson:

Enclosed is the Initial Site Investigation Report which was prepared to evaluate the degree and extent of subsurface petroleum contamination in the vicinity of the 550 gallon capacity No. 2 fuel oil underground storage tank (UST).

Six (6) soil borings were installed on SITE by TSEC on June 18, 1998. Soil samples were collected and field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). Additionally, a groundwater sample was collected from the SITE supply well and analyzed for VOCs by an environmental laboratory.

Data returned from these analyses, along with field observations, indicate that petroleum-related contamination has impacted the soils beneath the SITE, in the immediate vicinity of the fuel oil UST. The SITE water supply, however, has not been impacted.

We have recommended that the site supply well be sampled on a bi-annual basis to ensure that petroleum related compounds do not affect the water supply, and that the existing UST system be properly removed from service in accordance with state regulations.

If you have any questions regarding the results of this investigation, please feel free to contact us.

Sincerely,
TWIN STATE ENVIRONMENTAL CORPORATION

Jon Berntsen
Project Manager

cc: Mr. Chuck Schwer, VT Sites Management
Mr. Thomas Hayes, Esq.

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Phase (check one)	Type (check one)
✓ **Site Investigation**	☐ Work Scope
☐ Corrective Action Feasibility Investigation	✓ **Technical Report**
☐ Corrective Action Plan	☐ PCF Reimbursement Request
☐ Corrective Action Summary Report	☐ General Correspondence
☐ Operations & Monitoring Report	

SITE INVESTIGATION REPORT
November 16, 1998

Davidson Residence
33 Meadowland Farms Road
Quechee, Vermont

TSEC Project # 97-092
SMS Site # 98-2384

Report Prepared for:
Mr. and Mrs. Scott and Jody Davidson
P.O. Box 776
Woodstock, Vermont 05091
(802) 296-2925

Written By:
Jon Berntsen
Project Manager

Reviewed By:
John R. Diego
Vice President

1.0 INTRODUCTION

This report was prepared by Twin State Environmental Corporation (TSEC) under an agreement with Mr. and Mrs. Scott and Jody Davidson (SITE Owners) to present the findings of our recent subsurface investigation at the Davidson Residence at 33 Meadowland Farms Road in Quechee, Vermont (SITE) (See SITE Location Map, **Figure 1**, and SITE Plan, **Figure 2**). The investigation was initiated due to the discovery of petroleum impacted soils during August 1996 spill response activities.

2.0 BACKGROUND

On August 12, 1996, TSEC received a call from McGee Fuels, Inc. (MFI) to respond to an August 9, 1996 fuel oil spill at the residence of Mr. Richard Bulissa, located at 33 Meadowland Farms Road in Quechee, Vermont (the SITE is now owned by the Davidsons). The spill occurred during the delivery of fuel to a 550 gallon capacity underground storage tank (UST). MFI estimated the spill quantity to be between five (5) to ten (10) gallons of #2 fuel oil. The impacted area covered approximately seven (7) feet by nine (9) feet and included soil, grass, paver bricks, insulating material, and shrubbery.

TSEC began placing contaminated media into 55-gallon drums for subsequent off-SITE disposal. A total of four (4) drums were filled with materials removed from zero (0) to one (1) foot below ground surface (bgs) and transported off-SITE by Environmental Products and Services (EP&S) of Burlington, Vermont.

Following excavation, soil samples were obtained from one (1) to three (3) ft bgs and field screened for volatile organic compounds (VOCs) with a photoionization detector (PID). Concentrations were found to range from 150 parts per million volume (ppmv) to 258 ppmv. Based on these readings, TSEC recommended excavation and stockpiling of contaminated soils at an MFI facility located in Bethel, Vermont.

On August 14, 1996, following Vermont Department of Environmental Conservation (VTDEC) approval, TSEC observed the excavation of approximately 3 yd^3 of impacted soils by Wagner's Construction of West Burke, Vermont. During the excavation activities, PID readings were found to increase with depth, from 13 ppmv at 1 ft bgs, to 519 ppmv at 5 ft bgs. Based on this observation, TSEC felt that these soils might have been impacted by previous releases.

Consequently, three (3) soil samples were collected and submitted to Worldwide Geosciences, Inc. of Houston, Texas for characterization. The results of the analyses indicated that the samples have been impacted by two (2) distinct releases.

Further SITE activities were placed on hold until a responsible party could be identified. Above ground storage tanks (ASTs) were placed in the garage and the 550-gallon UST was removed from service. The UST, however, remains in the ground.

3.0 SCOPE OF SERVICES

The following scope of services, approved by the Davidsons and their insurance carrier (Nationwide Insurance), was performed by TSEC during this investigation:

- A SITE specific Health and Safety Plan (HASP) was prepared in accordance with OSHA guidelines (29 CFR 1910.120) (presented as **Attachment 1**).
- DIG SAFE was contacted and requested to provide an underground utility markout (Clearance #982 500 537) as required by law.
- Six (6) Geoprobe® borings were advanced at the SITE to investigate soil and groundwater contamination resulting from the UST. Recovered soil samples were screened for VOCs using a Thermo Environmental Instruments Organic Vapor Meter (OVM) equipped with a 10.6 eV PID lamp. Conventional headspace methods were utilized to measure the volatile components liberated from the soil.
- A complete SITE survey was conducted that included the location of pertinent SITE features and environmental sampling locations.
- A water sample was collected from the SITE water supply well and analyzed for VOCs by US EPA Method 524.2, and for total petroleum hydrocarbons (TPH) by US EPA Method 8100M.
- This summary report was prepared, discussing SITE history, investigation methods, procedures, and findings. Professional recommendations are also included that address the contamination discovered at the SITE.

4.0 SITE LOCATION AND DESCRIPTION

SITE Owner:	Mr. and Mrs. Scott and Jody Davidson	
SITE Address:	33 Meadowland Farms Road Quechee, Vermont	
Lat./Long.:	42°38'1.56" North	72°25'0.08" West
Zoning:	Residential	
Utilities:	Water-	On-SITE Drilled Supply Well
	Sewer-	On-SITE Septic System
	Electric-	Underground Connection from northwest corner of SITE.
Structures:	One (1) multi story residence with two (2) car garage. One (1) out of service fuel oil UST is located adjacent to the northwest corner of the residence.	

The SITE is located on Meadowland Farms Road, approximately ¼-mile east of Quechee Road in Quechee, Vermont (see SITE Location Map, **Figure 1**. The building on SITE is currently in use as a private residence. The current UST at the SITE is located adjacent to the northwest corner of the SITE building. This UST, however, is out of service.

The SITE is residentially zoned and is situated in a mixed residential and agricultural land use area. Properties adjacent to the SITE consist of wooded lots to the north and west, a horse field to the south, and residences to the east.

The topography of the north and west portions of the SITE are relatively flat. To the east, the topography slopes steeply to the east, down to an unnamed brook that turns and flows east into North Hartland Reservoir. To the south the topography is also relatively flat. The nearest surface water is the unnamed brook. A wetland feature, which is a result of historical gravel quarrying, is located approximately $^1/_8$-mile to the west of the SITE. The nearest sensitive receptor is the SITE supply well located approximately 25 ft ± from the out of service UST.

5.0 SITE INVESTIGATION ACTIVITIES

The subsurface exploration program was developed to gather data to provide a better understanding of the hydrogeology and contaminant distribution on SITE.

5.1 Advancement of Soil Borings

TSEC completed six (6) soil borings on SITE on June 18, 1998 using Geoprobe® direct push technology. The borings were installed in the following locations and are depicted on the SITE Plan, **Figure 2**.

- Soil Boring **B-1** was advanced directly to the east of the out of service UST.
- Soil Boring **B-2** was advanced directly to the north of the UST.
- Soil Boring **B-3** was advanced directly to the west of the UST, adjacent to the fill pipe.
- Soil Boring **B-4** was advanced along the western side of the SITE building, approximately 5 ft ± away from the foundation.
- Soil Boring **B-5** was advanced along the western side of the SITE building, approximately 1 ft ± away from the foundation
- Soil Boring **B-6** was advanced in the presumed downgradient direction of the UST, at the entrance to the SITE garage.

Further details of the soil borings and monitor well are presented below and in **Appendix A**: Boring Logs.

Borings were advanced to depths ranging from 6.0 to 11.0 ft bgs. All borings were logged, describing soil strata conditions, and analyzed with the PID using conventional jar headspace techniques.

General soil conditions encountered at the SITE consisted of fine to coarse sand and gravel fill overlying a green schist bedrock. Groundwater was not encountered during this investigation.

Contaminated soil was encountered during the installation of boring B-3 as evidenced by positive PID headspace readings. A headspace analysis performed on the samples collected indicated a maximum PID reading of 129.2 ppmv in between 0 and 4 ft bgs. All other PID readings within this boring ranged between 2.2 ppmv (10 to 11 ft bgs) and 125.8 ppmv (8 to 10 ft bgs). A fuel oil odor was observed throughout this boring.

Refusal was encountered in boring B-3 at a depth of 11 ft bgs. Based on the contaminant levels observed at this depth, it does not appear as though significant petroleum contamination has entered the bedrock formation.

5.2 SITE Geology

A summary of the predominate geological units encountered during boring activities consisted of fine to coarse sand and gravel fill overlying a green schist bedrock. Bedrock was encountered between 6.0 and 11.0 ft bgs.

Reports published by the Vermont Geological Survey indicate that the surficial deposits in the SITE vicinity are comprised of littoral sediments, predominantly sands and gravel. Bedrock beneath the SITE is reportedly comprised of a Devonian Age (345-395 million years) micaceous greenschist and quartzite known as the Gile Mountain Formation. For a more detailed description of geological units, see Monitoring Well and Boring Logs, **Appendix A.**

5.3 SITE Supply Well Sampling

On June 18, 1998, a SITE supply well sample was collected from the outdoor water faucet, located adjacent to the front entry way. This sample was submitted to Endyne, Inc. of Williston Vermont (Endyne) for laboratory analysis via US EPA Method 8100M for TPH, and US EPA Method 524.2 for VOCs.

Data returned from Endyne indicated that all compounds were below method detection limits (MDLs). All MDLs for the target compounds were below respective Vermont Groundwater Enforcement Standard (VGES) levels. The complete laboratory deliverables package received from Endyne is presented as **Attachment 2.**

6.0 RECEPTOR EVALUATION

During the SITE investigation activities, a sensitive receptor evaluation was conducted in the immediate vicinity. This investigation focused on surface water receptors, groundwater supply wells, and area residences.

A visual reconnaissance was performed along the brook, attempting to identify seeps, or other evidence that petroleum related contamination is entering the brook. No seeps were located.

The SITE and other residences in the vicinity obtain water from private drilled wells. Subsequent sampling of area wells was dependent on whether or not the SITE supply well contained detectable levels of petroleum contamination. With no detectable concentrations of petroleum related compounds in the SITE supply well (located within 25 ft ± of the release), and the presence of a surface water feature between the release and other supply wells, it does not appear necessary to sample additional wells at this time.

There are no other residential basements in the immediate vicinity and downgradient of the SITE, and the SITE building basement showed no obvious signs of impact (i.e.-elevated PID readings, petroleum odors, etc.).

No other sensitive receptors were identified within the immediate vicinity during this investigation.

7.0 SUMMARY AND CONCLUSIONS

Based on the information and analytical data obtained during this investigation, TSEC concludes the following:

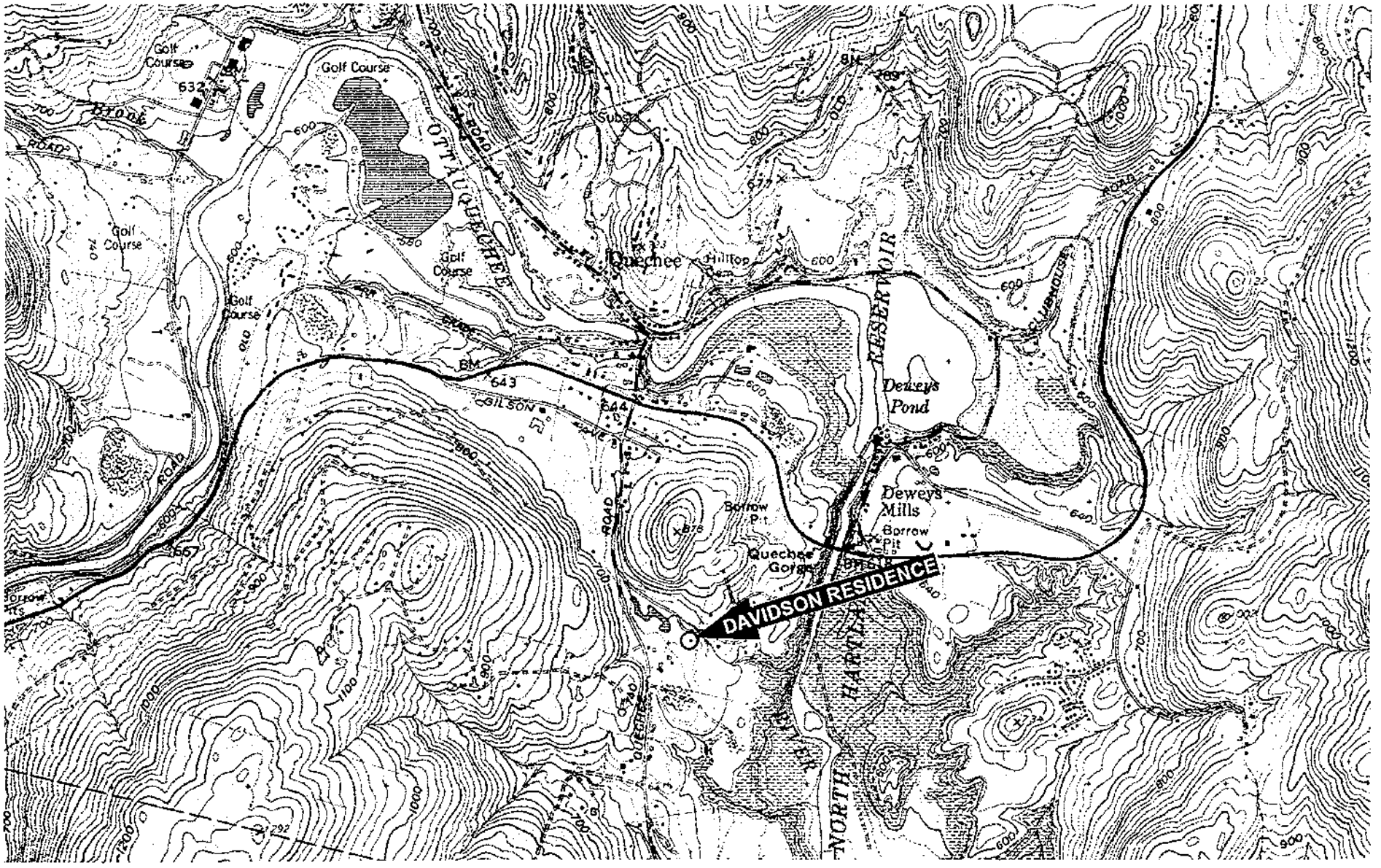
- The source of the contamination, the 550-gallon capacity UST at the site, is still in place.
- Soils encountered in the vicinity of the UST fill pipe exhibit elevated VOC levels as evidenced by PID readings.
- Bedrock was encountered prior to a competent overburden aquifer. Based on VOC levels in soil at the overburden/bedrock interface, it does not appear as though significant petroleum contamination has entered the bedrock formation beneath the SITE.
- The SITE supply well sample did not contain any detectable concentrations of target VOCs or any detectable levels of TPH.

8.0 RECOMMENDATIONS

Due to the presence of petroleum contamination in soils at the SITE, TSEC recommends the following:

- The UST in place, and out of service, should be removed from the ground as required by the State of Vermont. All waste generated should be handled in accordance with applicable local, state, and federal regulations.
- The SITE supply well should be sampled and analyzed for the presence of petroleum contamination on a bi-annual basis. Samples should be analyzed for TPH via US EPA Method 8100M and for VOCs via US EPA Method 524.2.

FIGURES



Source: USGS 7.5 Minute Topographic Series
Quechee, Vermont Quadrangle

0 2000
Scale (in feet) 1"=2,000'

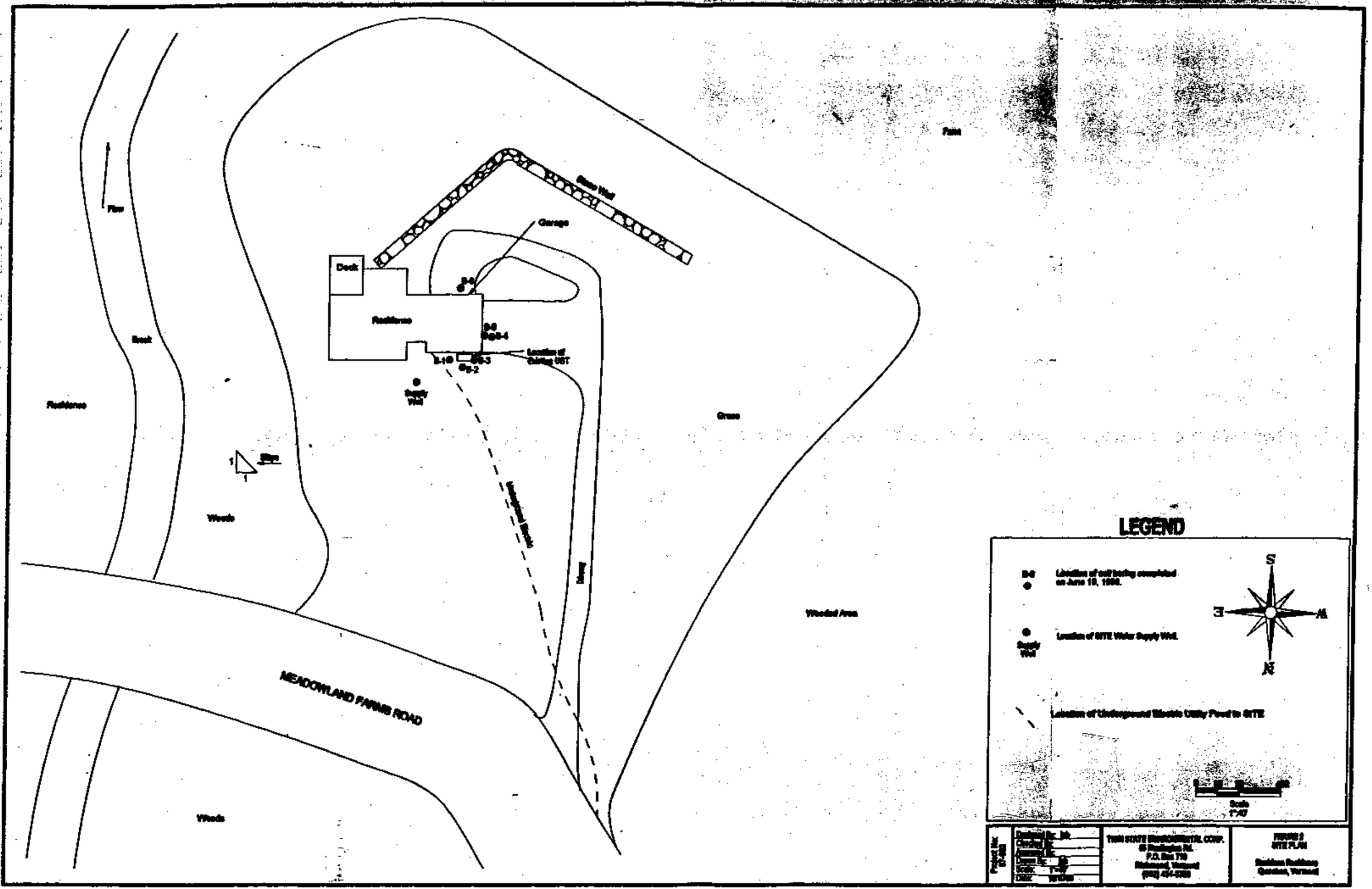
Davidson Residence
SMS Site #
Lat: 43.6343557 N
Long: 72.4143274 W

Project No: 97-092	
	Designed By: jpb
	Checked By:
	Approved By:
	Drawn By: jpb
	Scale: as shown
	Date: 06/02/98

TWIN STATE ENVIRONMENTAL CORP.
65 Huntington Rd.
P.O. Box 719
Richmond, Vermont
(802) 434-3350

FIGURE 1
SITE LOCATION MAP

Davidson Residence
Quechee, Vermont


Flow
Bank
Residence
Slope
Woods
MEADOWLAND FARMS ROAD
Woods
Dock
Residence
Garage
Water Well
Supply Well
Location of Existing UST
Underground Electric
Ditch
Grass
Wooded Area
Farm
LEGEND
Location of soil boring completed on June 18, 1990.
Location of SITE Water Supply Well.
Location of Underground Electric Utility Feed to SITE
S
E
W
N
Scale
1"=40'
Project No.
Date:
Checked By:
Drawn By:
Scale:
Date:
TWIN STATE ENVIRONMENTAL CORP.
P.O. Box 770
Richmond, Vermont
FIGURE 2
SITE PLAN
Residence
Garage, Vermont

APPENDIX A

TWIN STATE ENVIRONMENTAL CORPORATION

65 Huntington Road, P.O. Box 719 Richmond, Vermont 05477
(802) 434-3350 FAX: (802) 434-4478

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-1	WELL DEPTH:	NA	BORING DEPTH:	11.0 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA		
PROJECT NO:	97-092	SCREEN DIA:	NA	DEPTH:	NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE:	NA		
TSEC REP:	Jon Berntsen	RISER TYPE:	NA		
DRILLING CO:	TSEC	RISER DIA.:	NA	DEPTH:	NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	NA		
SAMPLING METHOD:	Macrocore Sampler	RISER CAP:	NA		
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	<0.1	2.0 ft recovery	0.0-0.75: Silty fine to medium SAND with trace of gravel. Light Brown 0.75-1.0: Broken rock fragment (schist). Green/gray. 1.0-2.0: Silty fine to medium SAND with trace of gravel. Light brown, dry.
1	O				
2					
3	W				
4	E	4-8	<0.1	1.0 ft recovery	4.0-5.0: Medium SAND. Brown, dry. Gravel in tip of core.
5	L				
6	L				
7					
8	I	8-12	<0.1	2.5 ft recovery	8.0-9.0: Medium SAND with gravel. Damp from 8.5'-8.9'. Brown. 9.0-11.0: Medium SAND and broken Schist bedrock.
9	N				
10	S				
11	T				Refusal at 11.0 feet bgs.
12	A				End of Sampling = 11.0 feet. End of Boring = 11.0 feet.
13	L				
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND

- CEMENT GROUT
- NATIVE BACKFILL
- BENTONITE SEAL
- SAND PACK
- WELL SCREEN
- RISER PIPE
- HS HEAD SPACE
- WATER LEVEL (APPROXIMATE)

GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

TWIN STATE ENVIRONMENTAL CORPORATION

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MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-2	WELL DEPTH:	NA	BORING DEPTH:	9.5 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA		
PROJECT NO:	97-092	SCREEN DIA:	NA	DEPTH:	NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE:	NA		
TSEC REP:	Jon Berntsen	RISER TYPE:	NA		
DRILLING CO:	TSEC	RISER DIA.:	NA	DEPTH:	NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	NA		
SAMPLING METHOD:	Macrocore Sampler	RISER CAP:	NA		
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	<0.1	2.0 ft recovery	0.0-0.75: Silty fine to medium SAND with trace of gravel. Light Brown
1	O				0.75-1.0: Broken rock fragment (schist). Green/gray.
2					1.0-2.0: Silty fine to medium SAND with trace of gravel. Light brown, dry.
3	W				
4	E	4-8	<0.1	1.5 ft recovery	4.0-5.5: Medium SAND and gravel. Brown, dry. Gravel in tip of core.
5	L				
6	L				
7					
8	I	8-12	<0.1	1.5 ft recovery	8.0-9.5: Medium and fine silty SAND with gravel. Brown. Slight odor.
9	N				
10	S				
11	T				Refusal at 9.5 feet bgs.
12	A				End of Sampling = 9.5 feet.
13	L				End of Boring = 9.5 feet.
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND

- CEMENT GROUT
- NATIVE BACKFILL
- BENTONITE SEAL
- SAND PACK
- WELL SCREEN
- RISER PIPE
- HS HEAD SPACE
- WATER LEVEL (APPROXIMATE)

GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

TWIN STATE ENVIRONMENTAL CORPORATION

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MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-3	WELL DEPTH:	NA	BORING DEPTH:	11.0 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA		
PROJECT NO:	97-092	SCREEN DIA:	NA	DEPTH:	NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE:	NA		
TSEC REP:	Jon Berntsen	RISER TYPE:	NA		
DRILLING CO:	TSEC	RISER DIA.:	NA	DEPTH:	NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	NA		
SAMPLING METHOD:	Macrocore Sampler	RISER CAP:	NA		
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	129.2	2.0 ft recovery	0.0-2.0: Medium SAND with gravel. Tan.
1	O				
2					
3	W				
4	E	4-8	10.0	2.0 ft recovery	4.0-6.0: Medium SAND and gravel. Tan.
5	L				
6	L				
7					
8	I	8-12	125.8	1.5 ft recovery	8.0-9.25: Fine to coarse SAND. 9.25-9.5: Silty fine SAND. 9.5-10.0: Broken SCHIST bedrock.
9	N				
10	S		2.2	⇦ (10.0-11.0 ft)	10.0-11.0: Medium and coarse SAND and weathered bedrock. Refusal at 11.0 feet bgs.
11	T				
12	A				End of Sampling = 11.0 feet. End of Boring = 11.0 feet.
13	L				
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND

- CEMENT GROUT
- NATIVE BACKFILL
- BENTONITE SEAL
- SAND PACK
- WELL SCREEN
- RISER PIPE
- HS HEAD SPACE
- WATER LEVEL (APPROXIMATE)

GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

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MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-4	WELL DEPTH: NA	BORING DEPTH: 7.0 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA
PROJECT NO:	97-092	SCREEN DIA: NA	DEPTH: NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE: NA	
TSEC REP:	Jon Berntsen	RISER TYPE: NA	
DRILLING CO:	TSEC	RISER DIA.: NA	DEPTH: NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE: NA	
SAMPLING METHOD:	Macrocore Sampler	RISER CAP: NA	
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.		

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	<0.1	2.0 ft recovery	0.0-2.0: Medium SAND with gravel foundation fill material. Tan.
1	O				
2					
3	W				
4	E	4-8	<0.1	2.0 ft recovery	4.0-6.0: Medium SAND and gravel. Tan.
5	L				Refusal at 7.0 ft
6	L				
7					End of Sampling = 7.0 feet. End of Boring = 7.0 feet.
8	I				
9	N				
10	S				
11	T				
12	A				
13	L				
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND: CEMENT GROUT; NATIVE BACKFILL; BENTONITE SEAL; SAND PACK; WELL SCREEN; RISER PIPE; HS HEAD SPACE; WATER LEVEL (APPROXIMATE)

GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

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MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-5	WELL DEPTH:	NA	BORING DEPTH:	11.0 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA		
PROJECT NO:	97-092	SCREEN DIA:	NA	DEPTH:	NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE:	NA		
TSEC REP:	Jon Berntsen	RISER TYPE:	NA		
DRILLING CO:	TSEC	RISER DIA.:	NA	DEPTH:	NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	NA		
SAMPLING METHOD:	Macrocore Sampler	RISER CAP:	NA		
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	<0.1	2.0 ft recovery	0.0-2.0: Medium SAND with gravel foundation fill material. Tan.
1	O				
2					
3	W				
4	E	4-8	<0.1	2.0 ft recovery	4.0-6.0: Medium SAND and gravel. Tan.
5	L				
6	L				
7					
8	I	8-12	<0.1	3.0 ft recovery	8.0-11.0: Medium SAND and gravel. Tan.
9	N				
10	S				Refusal at 11.0 ft
11	T				End of Sampling = 11.0 feet. End of Boring = 11.0 feet.
12	A				
13	L				
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND

- CEMENT GROUT
- NATIVE BACKFILL
- BENTONITE SEAL
- SAND PACK
- WELL SCREEN
- RISER PIPE
- HS HEAD SPACE
- WATER LEVEL (APPROXIMATE)

GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

TWIN STATE ENVIRONMENTAL CORPORATION

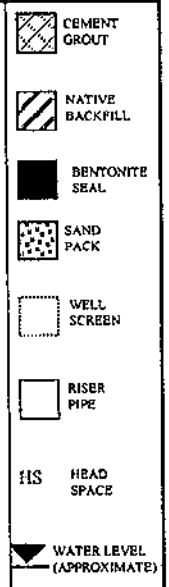
65 Huntington Road, P.O. Box 719 Richmond, Vermont 05477
(802) 434-3350 FAX: (802) 434-4478

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO:	B-6	WELL DEPTH:	NA	BORING DEPTH:	6.0 feet
PROJECT NAME:	Davidson Residence	DEPTH TO WATER:	NA		
PROJECT NO:	97-092	SCREEN DIA:	NA	DEPTH:	NA
INSTALL DATE:	June 18, 1998	SCREEN TYPE/SIZE:	NA		
TSEC REP:	Jon Berntsen	RISER TYPE:	NA		
DRILLING CO:	TSEC	RISER DIA.:	NA	DEPTH:	NA
DRILLING METHOD:	Geoprobe®	GUARD TYPE:	NA		
SAMPLING METHOD:	Macrocore Sampler	RISER CAP:	NA		
REMARKS:	Borings were backfilled with bentonite, drill cuttings, and sand.				

DEPTH IN FEET	WELL PROFILE	SAMPLE DEPTH (FT)	PID (PPMV)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES
0	N	0-4	<0.1	3.0 ft recovery	0.0-1.0: Medium SAND with gravel fill material. Tan. 1.0-2.5: Broken schist fragments. 2.5-3.0: Medium SAND. Brown, dry.
1	O				
2					
3	W				
4	E	4-8	<0.1	2.0 ft recovery	4.0-5.0: Medium SAND and gravel. Tan. 5.0-6.0: Broken gravel and weathered schist. Refusal at 6.0 ft End of Sampling = 6.0 feet. End of Boring = 6.0 feet.
5	L				
6	L				
7					
8	I				
9	N				
10	S				
11	T				
12	A				
13	L				
14	L				
15	E				
16	D				
17					
18					
19					
20					
21					
22					
23					
24					
25					

LEGEND



GRANULAR SOILS	
BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

NOTES:
1. See **Figure 2**, SITE Plan, for boring locations
2. PID readings were obtained using a Thermo Environmental Instruments Model 580 B PID equipped with a 10.6eV lamp. Conventional headspace techniques were used.

ATTACHMENT 1

HEALTH AND SAFETY PLAN

DAVIDSON RESIDENCE
33 MEADOWLAND FARMS ROAD
QUECHEE, VERMONT

TWIN STATE
ENVIRONMENTAL

P.O. Box 719 – Richmond, Vermont 05477 – (802) 434-3350 tsefs@together.net

SITE SPECIFIC HEALTH AND SAFETY PLAN

Site Name:	Davidson Residence	
TSEC Project #:	97-092	
SITE Location:	33 Meadowland Farms Road, Quechee, Vermont	
SITE Owner:	Scott and Jody Davidson	
SITE Contact:	Scott and Jody Davidson	(802) 296-2925
TSEC Project Manager:	Jon Berntsen	(802) 434-3350

1.0 EMERGENCY PHONE NUMBERS:

AMBULANCE	911
POLICE	911
HOSPITAL	802-674-6711 (Mt. Ascutney) 457-3030 (Ottaquechee Health Center) Minor Medical
FIRE DEPT	911
POISON CONTROL	802-658-3456 Burlington Vermont Poison Center
NATIONAL RESPONSE CENTER	800-424-8802
EPA (information line)	800-424-9346
CHEMTREC	800-424-9300

DIRECTIONS TO HEALTH CENTER:

From **SITE**, take a **RIGHT** onto ***Quechee Road***. At junction with ***Route 4***, turn **LEFT** towards Woodstock. Follow ***ROUTE 4*** into Woodstock. After Woodstock Mobil, Ottaquechee Health Center is ¼ mile on your right.

ESTIMATED TIME TO HEALTH CENTER: 15 MINUTES

2.0 SITE DESCRIPTION AND HISTORY

The SITE is a residence located in Quechee, Vermont. The activities at the SITE are being conducted as a result of a fuel oil release that was discovered in August 1996.

3.0 PROJECT ACTIVITIES

Activities which are expected to be conducted during this project are addressed in this HASP and summarized as follows:

- Geoprobe® investigation.
- Indoor air quality sampling
- Groundwater Sampling
- Surveying

4.0 SITE HAZARDS

HAZARDOUS MATERIALS KNOWN OR SUSPECTED TO BE PRESENT:

- Diesel/Home Heating Oil

SITE-SPECIFIC CONSIDERATIONS:

- Workers entering the investigation area ***MUST*** follow rules and regulations as outlined by 29 CFR 1910 and 29 CFR 1926 for operations at hazardous sites.

- Diesel Fuel is known to contain volatile organic vapors that may be harmful to worker health. If any of the warning signs of exposure are evident in workers, the use of air purifying respirators will be mandatory.

PHYSICAL HAZARDS:

- Heavy machinery such as drill rigs, excavators, and work vehicles.

CHEMICAL HAZARDS:

- Potential contact with the aforementioned chemicals.

NOISE HAZARDS:

- Heavy machinery and electrical motors.

5.0 SITE PERSONNEL REQUIREMENTS

HEALTH AND SAFETY TRAINING:

All personnel to perform work on SITE or enter the remedial zone will be required to have OSHA certification conforming to 29CFR 1910.120.

6.0 SITE HEALTH AND SAFETY PROCEDURES

PROCEDURES FOR SITE WORK:

This SSP defines the requirements and designated protocols to be followed at the SITE during investigation activities.

This SSP must be reviewed and signed by all personnel prior to entering the remedial or contaminant reduction zones on SITE.

In the event that any worker, or visitor does not adhere to the provisions of the SSP he/she will be requested to leave the work area.

ACTION LEVELS:

Action levels are those concentrations at which an upgrade in personal protective equipment (PPE) is required. The decision to upgrade shall be based on conditions at the work-SITE. Conditions that may be cause for upgrade may include, but are not limited to airborne particulates, odor, or slight symptoms of contact or exposure.

Initial activities will be performed in Level D work clothes (with the use of TYVEK suits if necessary) with upgrade capabilities to Level C (respirator) if the HSO deems it to be necessary.

PERSONAL PROTECTIVE EQUIPMENT:

General work clothes, steel toe boots, and eye protection. If necessary, air purifying respirators, latex overboots, TYVEK suits, and nitrile gloves will be used.

SITE CONTROL:

Control of the work SITE will be maintained with construction/CAUTION tape, traffic cones and/or other physical barriers. No personnel, other than those directly involved with the investigation should be near the drilling equipment at any time.

EQUIPMENT DECONTAMINATION:

Decontamination of equipment will be performed on SITE and the effluent water will be allowed to gather on plastic sheeting. The effluent will be allowed to evaporate, and the sheeting will be placed into a 55-gallon drum for subsequent disposal.

PERSONAL DECONTAMINATION:

Decontamination measures for this project may include the use of a boot and glove wash with a non-phosphate detergent followed by a boot and glove rinse. All wash water and solid wastes generated throughout the implementation of this project will be disposed of properly.

Specifically, wastes from this project will be disposed of as follows:

Solid wastes such as disposable PPE will be placed in an on-site receptacle (i.e. drum) for ultimate disposal as a regulated solid waste. Liquid waste (i.e.- wash water) will be allowed to evaporate while personnel are on-SITE. Prior to leaving the SITE, liquid wastes will be placed into drums.

EMERGENCY EQUIPMENT:

Fire extinguisher, first aid kit, water and eye wash station.

FIRST AID:

Ingestion - Call Poison Control - Follow instructions.

Inhalation - Remove person from contaminated environment. Seek medical attention.

Skin Contact - Brush off dry material, remove contaminated clothing. Wash skin with soap and water. Seek medical attention if necessary.

Eye Contact - Flush eyes with water for at least 15 minutes. Seek medical attention.

7.0 ON-SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions on site.

TEAM LEADER: Jon Berntsen
TEAM MEMBERS: Rod Lindsay, Brian Wagner,
HEALTH AND SAFETY PLAN
PREPARED BY: Jon Berntsen

HEALTH AND SAFETY PLAN
APPROVED BY: John R. Diego

8.0 ON-SITE PERSONNEL

Name	Company	Date

jpb:\project\97-092\HASP.doc

ATTACHMENT 2

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

JUL 7 1998

REPORT OF LABORATORY ANALYSIS

CLIENT: Twin State Environmental Corp.
PROJECT NAME: Queechee, VT/97092
DATE REPORTED: July 6, 1998
DATE SAMPLED: June 18, 1998

PROJECT CODE: TSEC1280
REF. #: 122,891

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 524.2

CLIENT: Twin State Environmental Corp.
PROJECT NAME: Queechee, VT/97092
REPORT DATE: July 6, 1998
DATE SAMPLED: June 18, 1998
DATE RECEIVED: June 18, 1998
ANALYSIS DATE: June 25, 1998

PROJECT CODE: TSEC1280
STATION: Tap-1
REF. #: 122,891
TIME SAMPLED: 1310
SAMPLER: R. Lindsay

Parameter	Detection Limit (µg/L)	Maximum Contaminant Level (µg/L)	Concentration (µg/L)
Benzene	0.5	5.0	ND[1]
Bromobenzene	0.5	------	ND
Bromochloromethane	0.5	------	ND
Bromomethane	0.5	------	ND
n-Butylbenzene	0.5	------	ND
sec-Butylbenzene	0.5	------	ND
tert-Butylbenzene	0.5	------	ND
Carbon tetrachloride	0.5	5.0	ND
Chlorobenzene	0.5	100.	ND
Chloroethane	0.5	------	ND
Chloromethane	0.5	------	ND
(2&4)Chlorotoluene	1.0	------	ND
1,2-Dibromo-3-chloropropane	1.0	0.2	ND
1,2-Dibromoethane	0.5	0.05	ND
Dibromomethane	1.0	------	ND
1,2-Dichlorobenzene	0.5	600.	ND
1,3-Dichlorobenzene	0.5	------	ND
1,4-Dichlorobenzene	0.5	75.0	ND
Dichlorodifluoromethane	0.5	------	ND
1,1-Dichloroethane	0.5	------	ND
1,2-Dichloroethane	0.5	5.0	ND
1,1-Dichloroethene	0.5	7.0	ND
cis-1,2-Dichloroethene	0.5	70.0	ND
trans-1,2-Dichloroethene	0.5	100.	ND
Dichloromethane	2.0	5.0	ND
1,2-Dichloropropane	0.5	5.0	ND

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REF.#: 122,891

Parameter	Detection Limit (µg/L)	Maximum Contamination Level (µg/L)	Concentration (µg/L)
1,3-Dichloropropane	0.5	------	ND
2,2-Dichloropropane	0.5	------	ND
1,1-Dichloropropene	0.5	------	ND
cis-1,3-Dichloropropene	0.5	------	ND
trans-1,3-Dichloropropene	0.5	------	ND
Ethylbenzene	0.5	700.	ND
Hexachlorobutadiene	0.5	------	ND
Isopropylbenzene	0.5	------	ND
4-Isopropyltoluene	0.5	------	ND
Naphthalene	1.0	------	ND
n-Propylbenzene	0.5	------	ND
Styrene	0.5	100.	ND
1,1,1,2-Tetrachloroethane	0.5	------	ND
1,1,2,2-Tetrachloroethane	1.0	------	ND
Tetrachloroethene	0.5	5.0	ND
Toluene	0.5	1,000.	ND
1,2,3-Trichlorobenzene	0.5	------	ND
1,2,4-Trichlorobenzene	0.5	70.0	ND
1,1,1-Trichloroethane	0.5	200.	ND
1,1,2-Trichloroethane	0.5	------	ND
Trichloroethene	0.5	5.0	ND
Trichlorofluoromethane	1.0	------	ND
1,2,3-Trichloropropane	0.5	------	ND
1,2,4-Trimethylbenzene	0.5	------	ND
1,3,5-Trimethylbenzene	0.5	------	ND
Vinyl Chloride	0.5	2.0	ND
Total Xylenes	1.0	10,000.	ND
MTBE	1.0	------	ND

NUMBER OF UNIDENTIFIED PEAKS: 0

Analytical Surrogate Recovery:

4-Bromofluorobenzene:	93.%
1,2-dichlorobenzene-d4:	90.%

NOTES:

1 None Detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

TRIHALOMETHANES BY EPA METHOD 524.2

CLIENT: Twin State Environmental Corp.
PROJECT NAME: Queechee, VT/97092
REPORT DATE: July 6, 1998
DATE SAMPLED: June 18, 1998
DATE RECEIVED: June 18, 1998
ANALYSIS DATE: June 25, 1998

PROJECT CODE: TSEC1280
STATION: Tap-1
REF. #: 122,891
TIME SAMPLED: 1310
SAMPLER: R. Lindsay

Parameter	Detection Limit (µg/L)	Maximum Contamination Level (µg/L)	Concentration (µg/L)
Bromodichloromethane	0.5	----	ND[1]
Bromoform	0.5	----	ND
Chloroform	0.5	----	ND
Dibromochloromethane	0.5	----	ND
Total Trihalomethanes		100.	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

4-Bromofluorobenzene:	93.%
1,2-Dichlorobenzene-d4:	90.%

NOTES:

1 None Detected

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

TSEC1281

122,891 — 122,892

CHAIN-OF-CUSTODY RECORD

97892

27682

Project Name: Quechee Site Location: Quechee, VT	Reporting Address: SAME AS →	Billing Address: 65 Huntington Rd. Richmond VT 05477
Endyne Project Number: TSEC1280	Company: Twin State Env. Corp. Contact Name/Phone #: Jon Bernstein	Sampler Name: R. Lindsay II Phone #: 434-5550

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
122 891	TAP-1	L	X		6-18-98 1310	2	40ml VOA		524.2	HCl/4	
	TAP-1	L	X		1310	2	4ml VOA		TPH 8100M Fuel oil	HCl/4	

Relinquished by: Signature

Received by: Signature

Date/Time

Relinquished by: Signature

Received by: Signature

Date/Time 6.18.98 3:35

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

JUL 2 1998

REPORT OF LABORATORY ANALYSIS

CLIENT: Twin State Environmental Corp.
PROJECT NAME: Queechee/97092
DATE REPORTED: June 30, 1998
DATE SAMPLED: June 18, 1998

PROJECT CODE: TSEC1281
REF. #: 122,892

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8100

DATE: June 30, 1998
CLIENT: Twin State Environmental Corp.
PROJECT: Queechee/97092
PROJECT CODE: TSEC1281
COLLECTED BY: R. Lindsay
DATE SAMPLED: June 18, 1998
DATE RECEIVED: June 18, 1998

Reference #	Sample ID	Concentration (mg/L)[1]
122,892	Tap-1; 1310	ND[2]

Notes:

1 Values quantitated based on the response of #2 Fuel Oil. Method detection limit is 0.4 mg/L.
2 None detected

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

97092 27682

Project Name: Quechee Site Location: Quechee, VT	Reporting Address: SAME AS →	Billing Address: 65 Huntington Rd Richmond, VT 05477
Endyne Project Number: TSEC1281	Company: Town State Env. Corp. Contact Name/Phone #: Jon Bernstein	Sampler Name: R. Lindsay et al Phone #: 434-3350

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 6-18-98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
	TAP-1	L	X		1310	2	40ml VOA		524.2	HCl/4°C	
122,892	TAP-1	L	X		1310	2	40ml VOA		TPH 8100M Fuel oil	HCl/4°C	

Relinquished by: Signature

Received by: Signature

Date/Time

Relinquished by: Signature

Received by: Signature

Date/Time 6-18-98 3:35

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest./PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										